

Hazardous Waste Characteristics Tests

Yes No

N/A

1.0 Staff

1.1 Laboratory supervisor(s) with overall responsibility for this area.

Name(s): \_\_\_\_\_

1.2 Analysts with Years of Experience in Parentheses

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ignitability

2.0 Equipment

Manufacturer

Model

Installed

Date

\_\_\_\_\_  
\_\_\_\_\_

2.1 Are manufacturers' operating manuals readily available?

2.2 Is there a laboratory reference standard? \_\_\_\_\_

2.3 What is the reference standard? \_\_\_\_\_

2.4 Are results of calibration kept in permanent bound logbook?

2.5 Has the instrument been modified in any way? \_\_\_\_\_

2.6 Are operations done in a vented area? \_\_\_\_\_

2.7 Is the test area free of drafts?

2.8 Is the sample container kept tightly sealed until the test portion is removed for analysis? \_\_\_\_\_

2.9 Are samples that flash after sustained heat from the flammability potential screen analysis (ASTM D4982) analyzed for a closed-cup flashpoint on a Pensky-Martens \_\_\_\_\_ or Seta Flash \_\_\_\_\_ closed-cup flash tester? \_\_\_\_\_

2.10 Does the Pensky-Martens apparatus meet specifications in ASTM D93, Annex A1 on Apparatus Specifications? \_\_\_\_\_

2.11 Does the Seta Flash apparatus meet specifications in ASTM D3828, Annex A1 on Flash Test Apparatus? \_\_\_\_\_

3.0 Procedures & Practices for Flammability Potential Screen

Exposure to Heat and Flame (Screening Procedure)(ASTM D4982, Method A)

- 3.1 Is a means of extinguishing the flame readily available  
(e.g., soil or sand, large beaker?) \_\_\_\_\_
- 3.2 Is the procedure performed with a bunsen burner \_\_\_\_\_ or a  
propane torch \_\_\_\_\_?
- 3.3 Is an approximately 5 gram test portion used? \_\_\_\_\_
- 3.4 Is the flame held immediately above (not in contact with)  
the test portion for 2 to 3 seconds? \_\_\_\_\_
- 3.5 Then, is the flame applied to the test portion for  
at least 15 seconds? \_\_\_\_\_
- 3.6 Is ASTM D4982 documented in the lab's methods manual? \_\_\_\_\_
- 3.7 Is this procedure performed exactly as documented in  
Method A of ASTM D4982? \_\_\_\_\_

Yes No

N/A

Exposure to Spark Source (Screening Procedure) (ASTM D4982, Method B)

- 3.8 Is an approximately 100-mL test portion placed in a plastic beaker inside a steel vessel? \_\_\_\_\_
- 3.9 Is the test portion covered with a watchglass and allowed to stand at ambient conditions for 5 minutes? \_\_\_\_\_
- 3.10 Is the ambient temperature recorded? \_\_\_\_\_
- 3.11 Is the lid for the steel vessel available for smothering flames for a positive test? \_\_\_\_\_
- 3.12 Is ASTM D4982 documented in the lab's methods manual? \_\_\_\_\_
- 3.13 Is this procedure performed exactly as documented in Method B of ASTM D4982? \_\_\_\_\_
- 3.14 Is a closed-cup flashpoint run on all samples that flash after sustained heating during the flammability potential screen? \_\_\_\_\_
- 3.0 Procedures & Practices Pensky-Martens Closed-cup Method (per ASTM D93 & SW-846 Method 1010)
- 3.1 Is the tester manual ( ) or automatic ( )?
- 3.2 In cases of dispute, is manual determination the referee method?
- 3.3 Are the 3 thermometers used according to specifications (ASTM E1 or IP thermometer specifications)? \_\_\_\_\_
- 3.4 Are samples stored in appropriate containers (not plastic)?
- 3.5 Is heating of specimens during preparation done with care to avoid loss?
- 3.6 Is dissolved or free water removed from the specimen?
- 3.7 Is meticulous attention paid to all details relating to the flame exposure device, size of test flame, rate of temperature increase, and rate of dipping the flame exposure device into the vapor of the specimen?
- 3.8 When the cup is in the stove is the locking device engaged?
- 3.9 Is the stirrer operating at 90 to 120 rpm? \_\_\_\_\_
- 3.10 Is the test flame inserted in the proper sequence? \_\_\_\_\_
- 3.11 Can the analyst demonstrate the "flash point" (does not confuse the true flash point with the bluish halo)? \_\_\_\_\_
- 3.12 Is the stirrer operated at  $250 \pm 10$  rpm for highly viscous

materials?

3.13 Is the stirrer stopped when applying the test flame?

3.14 Is the ambient barometric pressure used for correction of flash point?

\_\_\_\_

4.0 QA/QC for Pensky-Martens Closed-cup Method

4.1 Are duplicates & std. reference mat'ls. routinely analyzed?

4.2 Is the flash point of p-xylene reference standard determined

in duplicate at least once per sample batch? \_\_\_\_

Yes No

N/A

3.0 Procedures & Practices for Setaflash Closed-Cup Method per (ASTM D3828 & SW-846 Method 1020)

3.1 Is loss of volatile materials from sample avoided? \_\_\_\_\_

3.2 Is the sample syringe 2.0 ± 0.1 mL? \_\_\_\_\_

3.3 Is the use of plastic sample bottles avoided? \_\_\_\_\_

3.4 Is heat transfer paste used? \_\_\_\_\_

3.5 Is the test apparatus placed in subdued lighting and out of disturbing drafts? \_\_\_\_\_

3.6 Is the test apparatus standardized with a p-xylene or n-butanol reference standard? \_\_\_\_\_

3.7 Is the barometric pressure correction made at the beginning of the batch run? \_\_\_\_\_

3.8 If sample cooling is required are the proper personal safety devices in use? \_\_\_\_\_

3.9 Is a magnifying glass used to read thermometers? \_\_\_\_\_

3.10 Is a step wise determination using a fresh sample done for samples with a flash point at ambient or less? \_\_\_\_\_

4.0 QA/QC for Seta Flash

4.1 When the flash/no flash method is used, does report say so? \_\_\_\_\_

4.2 Are duplicates and reference standards routinely analyzed? \_\_\_\_\_

4.3 Is the flash point of the p-xylene or n-butanol reference standard determined in duplicate at least once per sample batch? \_\_\_\_\_

Corrosivity

pH Screening by pH Paper (ASTM D4980, Method A)

3.0 Procedures & Practices

3.1 For aqueous liquids, is the sample tested without addition of water? \_\_\_\_\_

3.2 For solids, sludges, and non-aqueous liquids, is approximately 1 mL (or 1 g) of waste added to approximately 10 mL of water and agitated for 10 seconds or until well mixed? \_\_\_\_\_

3.3 Is the sample placed onto the pH paper (i.e., not dipped into the sample)? \_\_\_\_\_

3.4 Has each batch of pH paper been verified by testing with \_\_\_\_\_

pH buffer and is the result documented? \_\_\_\_\_

3.5 Is ASTM D4980 documented in the lab's methods manual? \_\_\_\_\_

3.6 Is this procedure performed exactly as documented in  
Method A of ASTM D4980? \_\_\_\_\_

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Yes No

N/A

pH Screening by Electrometric Measurement (ASTM D4980, Method B)

3.0 Procedures & Practices

- 3.1 Are the electrodes filled with sufficient electrolyte?
- 3.2 Are the electrodes stored in pH 7.0 buffer with KCl added as directed by manufacturer when not in use?
- 3.3 If the meter can determine slope, is the slope of the electrode documented?
- 3.4 For aqueous liquids, is the sample tested without addition of water?
- 3.5 For solids, sludges, and non-aqueous liquids, is the pH measurement made o the aqueous portion of the 10% slurry of waste in water; e.g., the water layer from the water compatibility test (i.e., approximately 1 mL (or 1 g) of waste added to approximately 10 mL of water and agitated for 10 seconds or until well mixed?
- 3.6 Is ASTM D4980 documented in the lab's methods manual?
- 3.7 Is this procedure performed exactly as documented in Method B of ASTM D4980?

(See also check sheets for Miscellaneous Electronic Probes)

Steel Coupons (SW 846 Method 1110A)

2.0 Equipment

- 2.1 Does the setup consist of a kettle or flask (500-5000 mL), a reflux condenser, a thermowell and temperature regulating device, a heating device and a coupon support system?
- 2.2 Are the test coupons physically and electrically insulated from each other and from the setup?
- 2.3 Is test coupon SAE 1020 steel of about 3.75 cm in diameter?
- 2.4 Is the test coupon exposed area known to  $\pm 1$  per cent?
- 2.5 Is the test coupon cleaned prior to use by pickling        or electrolytic removal        or by grinding       ?

3.0 Procedures & Practices

- 3.1 Is the ratio of waste to surface at least 40 mL per cm<sup>2</sup>?
- 3.2 Is the test temperature 55°C?
- 3.3 After the 24 hour test period, is the surface cleaned of all corrosion before weighing?
- 3.4 Is the cleaning mechanical        or chemical        or

electrolytic \_\_\_\_?

\_\_\_\_ \_

3.5 Is a blank used to check sound metal lost during cleaning?

3.6 Are duplicate samples analyzed with each analytical batch?

3.7 Is the proper formula used to calculate corrosion rate?\_\_\_\_ \_  
\_ \_



Yes No

N/A

Reactivity

Note. A solid waste exhibits the characteristic of reactivity if a representative sample has any of nine defined properties. For this program the tests for a cyanide or sulfide-bearing waste that may generate gases when exposed to pH conditions between 2 and 12.5 are the only portions of this characteristic that has interim guidance

Screening of Cyanides (ASTM D5049)

3.0 Procedures & Practices

3.1 If a sample is inorganic and has a pH greater than 6, is a cyanide screening analysis performed? \_\_\_\_\_

3.2 Are all positive screens followed up with further testing? \_\_\_\_\_

Prussian Blue (ASTM D5049, Method B)

3.3 Are measured volumes (5 to 10 mL) of reagents added to the test portion? \_\_\_\_\_

3.4 Is the test portion made alkaline (pH 12-13) with 2.5N NaOH before any other reagents are added? \_\_\_\_\_

3.5 Is ASTM D5049 documented in the lab's methods manual? \_\_\_\_\_

3.6 Is this procedure performed exactly as documented in Method B of ASTM D5049? \_\_\_\_\_

Cyanesmo Paper (ASTM D5049, Method C)

3.7 Is an approximately 5 g test portion placed in a flask or test tube and a water-moistened test paper strip suspended in the vessel? \_\_\_\_\_

3.8 Is the test portion acidified with 5 mL of 6N sulfuric acid and the vessel sealed with a stopper immediately after the test portion is acidified? \_\_\_\_\_

3.9 Is the test paper read after two minutes? \_\_\_\_\_

3.10 Then, is the pH of the acidified test portion verified to ensure that the pH is below 2.0? \_\_\_\_\_

3.11 Is ASTM D5049 documented in the lab's methods manual? \_\_\_\_\_

3.12 Is this procedure performed exactly as documented in Method C of ASTM D5049? \_\_\_\_\_

Gas Detector Tubes (ASTM D5049, Method D)

3.13 Is approximately 50 mL of the buffer solution added to an approximately 20 g test portion? \_\_\_\_\_

- 3.14 Is a funnel used to direct the gases evolved from the  
reaction in the beaker? \_\_\_\_\_
- 3.15 Is at least a one-minute reaction time allowed beofre the  
results are read? \_\_\_\_\_
- 3.16 Is ASTM D5049 documented in the lab's methods manual?\_\_\_\_\_
- 3.17 Is this procedure performed exactly as documented in  
Method D of ASTM D5049? \_\_\_\_\_

Yes No

N/A

Screening of Sulfides (ASTM D4978)

3.0 Procedures & Practices

- 3.1 If a sample is inorganic and has a pH greater than 6, is a sulfide screening analysis performed using lead acetate paper \_\_\_\_ or gas detector tube \_\_\_\_? \_\_\_\_ \_\_\_\_ \_\_\_\_

Lead Acetate Paper (ASTM D4978, Method A)

- 3.2 Is a 5 to 10 g test portion placed in a beaker and a water moistened test paper suspended on the side of the beaker? \_\_\_\_
- 3.3 If the material is solid, is it slurried with approximately 15 mL of water? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 3.4 Is the test portion acidified with 1:1 HCl? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 3.5 Is ASTM D4978 documented in the lab's methods manual? \_\_\_\_ \_\_\_\_
- 3.6 Is this procedure performed exactly as documented in Method A of ASTM D4978? \_\_\_\_ \_\_\_\_ \_\_\_\_

Gas Detector Tube (ASTM D4978, Method B)

- 3.7 Is approximately 20 g test portion placed in a beaker with a magnetic stirring bar? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 3.3 If the material is solid, is it crushed into small particles less than 9.5 mm in size (3/8-in. mesh)? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 3.4 Is approximately 50 mL of the buffer solution added? \_\_\_\_ \_\_\_\_
- 3.5 Is ASTM D4978 documented in the lab's methods manual? \_\_\_\_ \_\_\_\_
- 3.6 Is this procedure performed exactly as documented in Method B of ASTM D4978? \_\_\_\_ \_\_\_\_ \_\_\_\_

Reactive Cyanide (SW-846, Section 7.3.3 of Chapter 7)

2.0 Equipment

- 2.1 Can the spectrophotometer handle a 1.0 cm cell or larger? \_\_\_\_
- 2.2 Is automated equipment a Technicon? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 2.2.1 Sampler? \_\_\_\_
- 2.2.2 Cyanide manifold? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 2.2.3 Proportioning pump? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 2.2.4 Colorimeter equipped with a 15 mm flow cell & 570 filter? \_\_\_\_ \_\_\_\_ \_\_\_\_
- 2.2.5 Recorder? \_\_\_\_ \_\_\_\_ \_\_\_\_

2.3 Is pyridine-barbituric acid reagent less than 6 months old?  
\_\_\_\_ 2.3.1 Is 2.3 documented?  
\_\_\_\_

3.0 Procedures & Practices

3.1 At time of collection are samples checked for oxidizing agents?

3.1.1 If found, are they removed with ascorbic acid?

3.1.2 Are samples preserved with 2 mL of 10N sodium hydroxide per liter of sample? \_\_\_\_\_

3.1.3 Are samples refrigerated at 4°C?

3.2 Is the pretreatment for cyanides amenable to chlorination done in a hood? \_\_\_\_\_

3.3 Are the air bubbles in the distillation flask adjusted to two per second? \_\_\_\_\_

	<u>Yes</u>	<u>No</u>
<u>N/A</u>		
3.4 Are steps taken to eliminate sulfides?	___	___
3.5 Are steps taken to eliminate nitrates and/or nitrites?		
3.6 Is the color development time consistent at the color forming step from sample to sample?	___	___
3.7 Are all standards distilled like the samples?	___	___
3.8 If not, are at least a high and a low?	___	___
3.9 Is sample distillation efficiency checked by spiking?		
3.10 Are all standards distilled when developing curves for samples with sulfide?	___	___
4.0 <u>QA/QC</u>		
4.1 Is one blank per sample batch done?	___	___
4.2 Are check standards done after 15 samples?	___	___
4.3 Is there one duplicate in every 10 samples?	___	___
4.4 Are spiked samples used to check the procedure?	___	___
4.5 Is the method of standard additions used when there are matrix interferences?	___	___

#### Reactive Sulfide (SW 846, Section 7.3.4 of Chapter 7)

3.0 <u>Procedures &amp; Practices</u>		
3.1 Have samples been preserved with zinc acetate?	___	___
3.2 Are precipitated samples done in the original bottle?		
3.3 Are dewatered samples and the glass-fiber filter paper done in the original bottle?	___	___
4.0 <u>QA/QC</u>		
4.1 Are calibration curves of one blank and three standards done every hour of continuous analysis?	___	___
4.2 Is a blank run with each sample batch?	___	___
4.3 Are check standards done every 15 samples?	___	___
4.4 Is one duplicate done every ten samples?	___	___
4.5 Are spiked samples used to check procedures?	___	___

#### Free Liquids

##### Paint Filter Liquids Test (SW-846, Method 9095)

#### 3.0 Procedures & Practices

- 3.1 Is the paint filter test run on all samples which are  
sludges or contain observable liquids before they are  
disposed in a landfill? \_\_\_\_\_
- 3.2 Is the paint filter liquids test documented? \_\_\_\_\_
- 3.3 Is the test performed as mandated in SW-846, Method 9095?\_\_\_\_  
\_\_\_\_\_

Yes No

N/A

Toxic Characteristic Leaching Procedure (TCLP) SW-846, Method 1311)

2.0 Equipment

2.1 Agitation apparatus. \_\_\_\_\_

2.1.1 Is the extraction vessel rotated end-over-end? \_\_\_\_\_

2.1.2 Is the rotation at  $30 \pm 2$  rpm? \_\_\_\_\_

2.2 Extraction vessel (TCLP) \_\_\_\_\_

2.2.1 Is the vessel borosilicate glass? \_\_\_\_\_

2.2.2 Is the volume 2 L? \_\_\_\_\_

2.2.3 Are plastic bottles in use? \_\_\_\_\_

2.3 Extraction vessel (ZHE) \_\_\_\_\_

2.3.1 Is the zero-headspace extraction vessel (ZHE) used for volatile constituents? \_\_\_\_\_

2.3.2 Are the O-rings replaced frequently? \_\_\_\_\_

2.3.3 Is 2.3.4 documented? \_\_\_\_\_

2.3.4 Is the ZHE vessel pressure checked after each use? \_\_\_\_\_

2.3.5 Are psi to torque-inch-pounds conversion tables available? \_\_\_\_\_ 2.3.6 Are vessels of glass, PTFE or type 316 stainless steel? \_\_\_\_\_

2.3.7 Are HDPE, PVC or polypropylene devices used for metals mobility only? \_\_\_\_\_

2.4 Filtration

2.4.1 Are all filtrations done in a hood? \_\_\_\_\_

2.4.2 Are filtration devices fabricated from inert materials? \_\_\_\_\_

2.4.3 When evaluating wastes for volatiles is the ZHE used? \_\_\_\_\_

2.4.4 If the internal glass fiber filter ruptures, is an in-line glass fiber filter used? \_\_\_\_\_

2.4.5 Is the recommended filter device of 1.5L and equipped to accommodate a 142 mm diameter filter in use? \_\_\_\_\_

2.4.6 Is positive pressure filtration practiced? \_\_\_\_\_

2.4.7 Are filters of borosilicate glass and without binders? \_\_\_\_\_

2.4.8 Are acid washed filters used with metal mobility valuations? \_\_\_\_\_

2.5 Extract collection devices \_\_\_\_\_

2.5.1 Is a TEDLAR bag used when the extract is aqueous? \_\_\_\_\_

2.5.2 Is use of syringe avoided in 2.5.1 above? \_\_\_\_\_

2.5.3 If significant amounts of non-aqueous liquid phase is present the analyst may use the bag or a syringe. Does the analyst consistently use one device throughout the extraction? \_\_\_\_\_

2.6 Extraction fluids \_\_\_\_\_

2.6.1 Is the preparation of fluid #1 documented? \_\_\_\_\_

2.6.2 Is fluid #2 documented? \_\_\_\_\_

### 3.0 Procedures & Practices for TCLP

#### 3.1 Samples

3.1.1 Are 3 separate samples available for each determination? \_\_\_\_\_

3.1.2 Are samples free of added preservatives? \_\_\_\_\_

3.1.3 Is care taken to avoid loss of volatiles? \_\_\_\_\_

3.2 Preliminary evaluation \_\_\_\_\_

3.2.1 Is percent solids determined? \_\_\_\_\_

3.2.2 Is a determination made as to whether particle-size reduction is necessary? \_\_\_\_\_



Yes No

N/A

3.0 Procedures & Practices for TCLP (continued)

3.2.3 Is a determination of appropriate extraction fluid made?                3.3 Volatiles not involved

3.3.1 Is sufficient extract produced to do all desired analyses?               

3.3.2 Is pressure during filtration increased in increments to avoid filter breakage?               

3.3.3 Is filtration effort stopped when 50 psi is reached and liquid flow has stopped?               

3.3.4 Is a PTFE-coated sieve used in size reduction?

3.3.5 Is the extraction done at  $30 \pm 2$  rpm for  $18 \pm 2$  hrs at  $22 \pm 3^\circ\text{C}$ ?               

3.3.6 Is excess pressure vented in a hood?               

3.3.7 Is pH of extract recorded after extract is collected?

3.3.8 Is the extract immediately aliquoted and properly preserved?               

3.4 Volatiles involved               

3.4.1 Is the ZHE used to obtain extracts for volatiles only?

3.4.2 Is the ZHE charged with sample once and not opened until the final extract has been collected?               

3.4.3 Are multiple extractions done to obtain 25 gms of sample?               

3.4.2 Are the fractions stored properly?               

3.4.3 Is particle-size reduction done as the sample is taken?

3.4.4 Is exposure to the atmosphere held to a minimum?

3.4.5 Is sieving done?               

3.4.6 Is centrifugation avoided when using slurries?

3.4.7 Is all headspace forced out (hood)?               

3.4.8 Is filtration stopped at 50 psi?

3.4.9 After the extraction fluid is added to the ZHE device is any headspace vented in a hood?               

3.4.10 Is ZHE rotated at  $30 \pm 2$  rpm for  $18 \pm 2$  hours at  $22 \pm 3^\circ\text{C}$ ?               

3.4.11 Is the ZHE pressure checked after the extraction period?

3.4.12 Is extract aliquoted & stored with minimal headspace  
at 4°C? \_\_\_\_\_

4.0 QA/QC

4.1 Is a memory effect check done?

4.2 Are matrix spikes done to monitor the adequacy of methods?

4.3 Are QC procedures in use? \_\_\_\_\_

4.4 Method of Standard Additions

4.4.1 Is the method used if recovery is not between 50-150%?

4.4.2 Is the method used if the concentration measured in the  
extract is within 20% of the regulatory threshold?

4.4.3 Is a schedule available showing when a specific sample  
must be extracted and when the extract must be analyzed?  
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